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ANIMAL KINGDOM

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ANIMAL KINGDOM

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Aspects of Present-Day Conservation. II.

Extracts from recent writings and addresses by
FAIRFIELD OSBORN, *the Society's President*

Of all the many resources upon which man depends, food and the food-bearing soils are the most important to his continued existence. An adequate supply, from the earliest times to the present day, has always been his greatest preoccupation. In this search, how many peoples in how many wars, hegiras and migrations, have coursed over the Earth's surface? Yet today the problem is still with us – and in an intensified form. For unless we can find a way to provide adequate subsistence to rapidly increasing populations, social and political advancement can never be attained. (*Role of Research in Conservation of Our Nutrition Resources*).

The tide of the earth's population is rising, the reservoir of the earth's living resources is falling. The cultivable areas of the earth, in relation to population, are now so limited that there are less than 2 acres available per person. Regardless of how food experts may differ on man's needs, this will not be enough to feed more people, pressing for higher living standards, if we continue our reckless practices. (*Address: Herald Tribune Forum*).

Dependence on the processes of nature does not, in any sense, exclude science and its vast benefits. Science can aid and abet natural processes, but it cannot replace them. The scientist's hybrid corn must sprout, root and grow by benefit of light, air, moisture and food. We can substitute artificial insemination for the bull, but the cow must still bear the calf. (*Address: 14th Educational Conference*).

. . . resources are merely the agents or media by which human society may reach social and ethical maturity. The political climate of a country, a continent or of our world as a whole, is dependent primarily upon our discovering processes that lead to a balanced relationship between human demands and the earth's productivity. (*World Resources Situation – United Nations Scientific Conference on Conservation and Utilization of Resources*).

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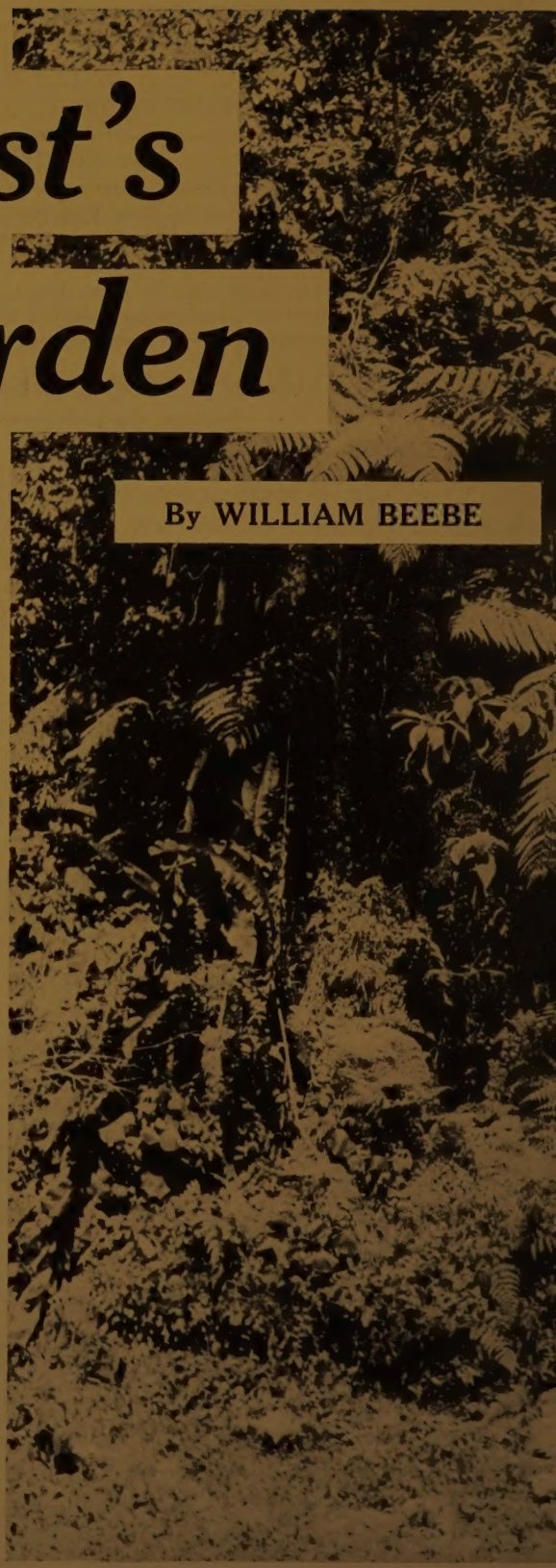
Zoologist's Garden



By WILLIAM BEEBE

This is another of Dr. Beebe's "newsletters" from the new Laboratory of the Department of Tropical research at "Simla," in Trinidad.—Editor.

THE GARDEN in all directions from Simla forces itself on our attention. The light on my table becomes diluted and I look up to see a delicate vine with orchid-like blossoms filigreeing the wire screening. The tempo of growth seems several times speedier here than in the north. A handful of jungle soil and a trowel of manure, and seeds and cuttings fairly leap into life. They even plant themselves. A lovely aristolochia vine from a seed dropped by some passing tanager has coiled all about a small palm. Setting out plants of Buddleia, butterflies gather and jostle one another at its blossoms before the roots are in the ground.

I seem to bear heavily on the botanical side, but if your laboratory is practically in the tree-tops, and a spectrum of blossoms — trees, shrubs, vines, orchids, lilies — impinges on the eye in every direction, only color-blindness could account for inattention.

Watson Webb's shortwave lamp is doing a beautiful job as a source of ultraviolet which is much more dependable than the temperamental tropical sun. Night or day, rain or shine, it glows steadily in the darkroom, illuminating butterfly wings, beetles, orchids and assorted strange blossoms. Their shortwave reflections can in this way be separated from the humanly visible components of their colors, and photographed for study and comparison. We are finding that butterfly markings which appear to us a deep, rich red are

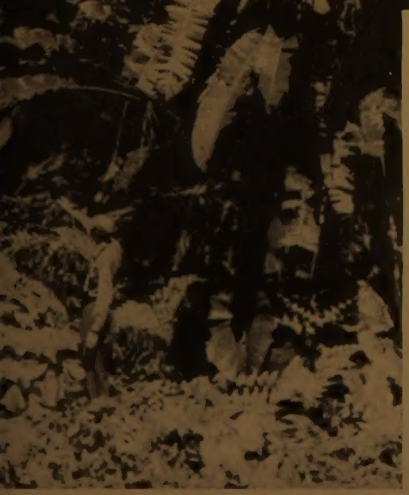
presumably seen by their own companions as the purest ultraviolet. An orchid that is down-right purple to a mere human being, seems to be perceived by a visiting butterfly as a quite unimaginable ultravioletish yellow.

The core of our laboratory compound studies is the Ordway Insect House. It is all wire mesh, twelve by eighteen by nine feet, in the shelter of the grove of mahogany trees, and is furnished with gauges and meteorological instruments, as well as orchids, lantana, passion flowers and air-plants beloved by butterflies. When Jocelyn Crane goes in with a breakfast of fresh lantana, a cloud of melpomenes flutters toward her and covers the blooms with a maze of waving black and scarlet wings. Every particle of fear passes with the first day or two, and we can watch flower discrimination, as well as proboscis action and egg-laying with a hand lens. Serious study this season will be confined to this heliconid species; its senses, releasing mechanisms, its limits of instinct. For contrast the great cage is inhabited by blue morphos, skeleton butterflies, tapestry beetles and giant, scarlet-winged grasshoppers. Provide a generous enclosure, companions, appropriate flowers and brood plants and a butterfly's happiness and content with life are complete.

Another insect study which occupies many odd hours is what might be called an investigation of the Realm of Small. I have long wanted to get

LEFT—Almost at the door of our Tropical Research Laboratory is the great national forest of Trinidad.

BELOW—Cradled among jungle-clad hills of the northern range, "Simla" is naturally garden-girt.



A "captive garden" in the small, screened hut known as the Ordway Insect House brought the jungle closer, permitting intimate study of insect behavior patterns.

A Mango Hummingbird nested in a Flamboyant tree just outside the laboratory and it was possible to watch all stages in nesting and rearing the young.

away from the pseudo-majesty of man's six feet of height. What I have found by demeaning myself to ant height (and a very small ant at that) is an unexpected blow to human conceit. Protective and warning coloration, mimicry, elaborate adaptive characters and delicate releasing mechanisms are in active operation in beings from one to four millimeters in length, exactly as they are in man's coarse visual world. In this lesser cosmos a beetle one-quarter inch in length is a giant.

A search-light and a vertical sheet are dismaying to our time and ability in the wealth of strange creatures which are drawn to it each evening: primitives, such as earwigs and embiids, mothlets with wings split into a dozen separate feathers, others with splashes of golden gobbets; many wholly without names, most with unknown life histories.

As we studied the home life of the bat falcons of Rancho Grande, so here, by raising my eyes at my table, I can see the nest of a mango hummingbird. From the initial laying of the first strand of cobweb foundation to the flight of the twins, their lives have been an open book. At this moment, as I watch, the mother hummingbird returns and perches on the rim of the empty nest. Is another brood imminent? After weeks of laying, brooding, feeding and worry she has not a single disarranged feather. What a gal!

We have made five exploratory trips: first, to the Guacharo Cave on Dr. Wright's estate.

Henry Fleming led an all-day trip to the Oropouche Caves where some two hundred guacharos were found and underground catfish up to twelve inches, besides other organisms. Another all day trek, a hard tramp, was to the summit of El Cerro del Aripo, three thousand and eighty-five feet. Here was new and characteristic vegetation, with ground orchids and so-called mountain mangroves, altogether different from our familiar surroundings.

Another day we motored twenty miles to the north shore, up our valley and on to Blanchisseuse, over an excellent asphalt road as twisting

as an eel. Beyond the pass we entered a great area of government preserved forest, tumbled mountains and jungle-clad valleys with tall tree-ferns and rushing streams. The little coastal village proved to be unexpectedly clean and picturesque, dotted with coconut palms and fronted by many lovely tropical bays, with white sand and outjutting rocky headlands. Lines of great white breakers had no undertow, and were flown over by frigatebirds and wavering lines of pelicans.

Laura Schlageter took two weeks off and made a scouting trip, flying over and around Angel Falls, the highest in the world, far in the hinterland of Venezuela. The plane continued to a newly made landing strip, and camp was set up on a gigantic flat-topped mesa, inhabited only by a small tribe of primitive Indians complete with breech clouts and blow-guns. From Simla to the massif of Tramantepui is only five flying hours, which adds another to the variety of Simla's suburban terrain.

The most important item in this month's report is the inception and completion of the purchase of a magnificent extent of mountain ranges close to, and bounding the horizon of Simla to the south and west. This is known as the St. Patrick Estate (with alternative older names of Vanbrugh Park and Anatole!)

This was the property of the late Sir Norman Lamont with whom we formed a close friendship last year. His almost perfect collection of Trinidad butterflies and moths, formed over an extent of forty years, and this very estate were placed at our disposal to use in our researches. Late last year on one of his estates in the south of the island, he was attacked by one of his prize bulls and badly gored. As he was eighty-three years of age, there was no chance of recovery. When the conditions of his will became known I made an offer for St. Patrick which was accepted, and the purchase was consummated on May eighteenth, when I paid down ten per cent. of the price. Part of the ranges included can be seen in the background of the illustrations on pages 141 and 142 of my article on Simla in ANIMAL KINGDOM for September-October, 1949. Sharing in this venture are our very close friends, Mr. and Mrs. Frank Storms, fellow members of our Zoological Society, who are remodeling the charming house near the entrance of the estate.

The property consists of one hundred and seventy-six acres and includes a stretch of the Arima River itself, with a dam and a bathing pool. It extends up a wide valley and on up to the crests of two ranges. It is bounded principally by government preserved forest. Near the road at the southern end are two of the most enormous, orchid-hung saman trees I have ever seen. There are some twelve thousand bearing cocoa trees besides hundreds of citrus, tonka beans, nutmeg and plantings of teak, all of which will be worked by Dr. Wright on a fifty-fifty profit basis. Most of the land is untouched jungle and with government reservations affords primeval conditions for study and collecting. If I had not taken it, I fear some lumber company would have bought it, for there are a great many uncut giant trees which

Students from the Imperial College of Tropical Agriculture visited the laboratory for an introductory seminar. More formal talks are planned for next year.

A little Tree Porcupine lived for a time in the laboratory and was an entertaining pet—except at night when it usually called with a "dying yowl like a back fence cat, plus a hopeless final sigh!"

are valuable as timber. The Zoological Society can now feel that in the two hundred acres of the two estates it has an unparallelled site and opportunities for whatever ecological studies we can undertake.

* * *

If rain were a subject of absorbing interest this brief and final report would be a best seller. Our rather unworthy silver lining of smug satisfaction is that this year we share the unusual vagaries of weather with many other parts of the world. All over Trinidad are land-slides and washouts, cattle and furniture floating down bridgeless rivers. Simla takes no harm and we adapt our trips to the intervals between storms.

The flooding washes out interesting terrestrial and burrowing creatures among which are young ferdelance and boa constrictor infants. Constant ant and termite flights attract frogs, lizards and birds even before the rain ceases. Judging by the inmates of the Ordway Insect House the heaviest downpours have no ill effect on the most delicate butterflies.

Dr. Schneirla [Dr. T. C. Schneirla, Curator of the Department of Animal Behavior at the American Museum of Natural History] arrived on May twenty-sixth and ever since has persisted in long climbs and treks, exhibiting amazing amphibious nonchalance of body and mind. He may arrive at the laboratory soaked, drenched, sodden; but in the depths of his haversack is a small, grimy vial containing a single, bloated, overgrown army ant. The rain is as though it never had been, for at the expense of innumerable bites and stings he

Saman trees are truly giants of the Trinidad fores and this one on the St. Patrick Estate near the lab oratory was a garden in itself—a garden so rich hung with ferns, mosses, many kinds of epiphyte

has found and captured a group of royal attendants together with their physogastric Queen in her prime!

Under our lens she continues to lay egg after egg, each caught in the jaws of a faithful sterile lady-in-waiting. If we had time to watch or the conditions were perfect, the succession of eggs might reach the appalling number of twenty to twenty-five thousand. Ted Schneirla's success in establishing a good-sized nest of functioning army ants in complex artificial trays in the laboratory, foreshadows the certainty of similar, more extensive exhibits in a suitable Insect House in our Zoo.

On May twenty-seventh and again on the thirtieth, two groups of a dozen graduate biology students from the Imperial College came to Simla for an introductory seminar. Dr. Schneirla, Miss Crane and I gave short talks, and were asked about the possibility of a series of more formal lectures the coming year. They were keen, intelligent boys, coming from England, Scotland, Ceylon, India, China, Central Africa as well as British Guiana and Honduras and the Antilles. Most were majoring in Economic Zoology and Conservation.

Aside from the progress of our respective problems, which is hearteningly satisfactory but whose gradual increments would make dull reading, life at Simla is enlivened by unexpected happenings. One series was the combating of intelligent-seeming activities of plants. Here are two. Our favorite cyp tree, which overhangs the laboratory, carried an ever-increasing burden of mistletoe which was sucking its life sap. The berries are beloved of birds, who feed on them, transport them and unwittingly plant them high up in crevices of bark.

These great bunches of parasites must be removed, and we earnestly wished that Chiri, our tame Capuchin Monkey, could be trusted to do the job. But we knew all too well that in addition to impolite remarks and gestures in our direction he would only eat the berries and then proceed to defoliate the foliage of the cyp itself. As a substitute we hired Ram John, alias "The Boy," who swarmed up the trunk with fingers and toes, and with a twelve-foot cocoa-cutter amputated every morbid growth. A few days later the tree seemed to take a long breath and put out myriads of new leaves.

A second botanical threat was subterranean. An important pipe line became clogged and patient probing showed a wide extent of closely packed rootlets. A thirsty cedar tree many yards away had sent out scouting roots just below the surface, and when they were over the water-bearing pipe some vegetal divining instinct directed them downward. A tiny crack was sufficient to give admittance. The swelling, water-filled roots forced the crack wider and soon the whole diameter of the pipe was crammed with a maze of well-nourished rootlets.

Among the multitudes of insects which come to our electric-lighted sheet, strange, long-horned unbeetlelike beetles claim our interest for their evolutionary significance. One has two pairs of antennae — or at least in size, pattern, color and movement the hind legs imitate the real antennae, until any assaillant would be made dizzy trying to make out which end to attack. Another is so like a yellow-winged ichneumon fly that it was wrongly labelled and pinned in the wrong box; others have blazing fluorescent spots on the elytra. Finally a beetle appeared so like an ant that the ants themselves were fooled.

The Ordway Insect House is being shared with Dr. Simmons of the Imperial College of Tropical Agriculture who is introducing hesperid butterflies. These mate and lay eggs on suitable plants undisturbed by the parasitic wasps which cannot make their way in through the fine mesh. This is an extension of his studies of soil conservation and the control of insect pests, subjects of his teaching and experimentation.

St. Pat's Estate is so unlike Simla, although only two hundred feet lower on the valley floor, with somewhat different luxuriance and equally rich fauna, that I withhold any further comment until we have given it more study next year. I measured one of the two giant Saman trees near the entrance and found it eighteen feet around at man height, while the diagonal of land covered by the far-flung, outermost circle of branches is a full forty-five yards.

Less than three hundred feet from these trees we have found a five by five foot tunnel which has been driven deep into the side of the mountain, dug by gold prospectors when color was found years ago. No one knows how deep it goes. At present, at least near the entrance, it is occupied by hosts of bats, frogs and centipedes.

One bird note is the finding of a small assemblage of dancing gold-headed manakins which I located near one trail of St. Pat's, while Dr. Schneirla has just discovered, not far away, the amazing number of one hundred black-and-white manakins, occupying a dancing arena of less than a half acre.

My bedroom, at present, is no place for anyone suffering from insomnia, or restless from a bad conscience. At nine o'clock our captive owl begins his mournful call, and his cage mate, a tree porcupine, voices an antiphony, in part like the dying yowl of a back fence cat, plus a hopeless final sigh. A rat, intended for food of the boa, continues all night to leap noisily upon the head of his prospective executioner (as a matter of fact the rat never was harmed). Whenever I wake, the scraping of the snake's scales and the thuds of the bounding rat furnish the percussion part of the nocturnal orchestra. A pigmy owl beyond the terrace is cricket-like in its monotonous tomtom, metronome rhythm, and a poor-me-one in the middle distance seems stimulated by the lugubrious porcupine to emulous imitation of the wails of a lost soul.

Inside my room the ceiling is always cross-hatched by a half dozen fireflies — the luminous Morse code of the common ones and the twin headlight comets of big elaters. The air is frequently stirred by the swishes of a vampire quartering outside my net, until at five-fifteen the first Trinidad house wren begins to sing. All of these vocal and visual creatures disturb me less than will the automobile horns on a New York street.

This ends our first season at Simla. Future scientific results will prove its permanent worth.

BOX TORTOISE NURSERY IN A GARDEN PATH

About 8 o'clock on the evening of June 25, 1948, Staff Photographer Sam Dunton saw something moving among the stones of his Long Island garden path. It was a Box Tortoise, digging with its hind feet, and when the hole was so deep the tortoise's legs could reach no farther it deposited six leathery eggs and then refilled the cavity with earth. Its maternal duties at an end, the tortoise ambled away about 11 P.M.

As so often happens when an interesting natural history event occurs before one's eyes, Mr. Dunton's cameras were many miles away, in the Zoological Park. However, he marked the spot well and made a mental note to be present some months later when the young tortoises emerged. He *was* present—and these pictures are the result.

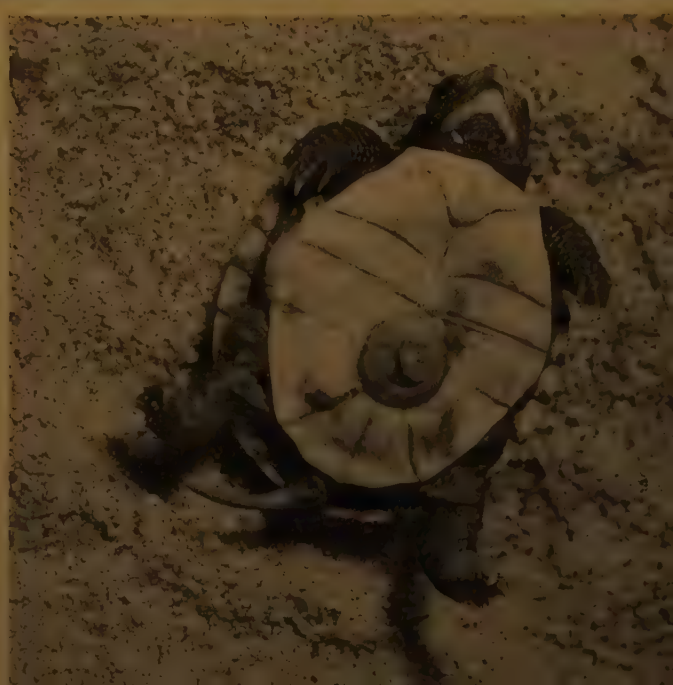
Preparing to open the cavity: the eggs are buried under a spot indicated by the trowel.

CENTER ROW

LEFT—The last of the 4 living tortoises freed itself from the shell at approximately 2 A.M. CENTER—Its eyes were closed as it made a final struggle out. RIGHT—It seemed to take tremendous effort for the little creature to break entirely free.

BOTTOM ROW

LEFT — This ventral view of the newly-hatched tortoise exposes the yolk sac still attached to the plastron. It supplies food. RIGHT—A hatchling and an adult Box Tortoise for a comparison of their sizes.



TOP ROW

LEFT—On Sept. 26 the nest was uncovered and here are four of the six eggs, with young tortoises beginning to make an exit. CENTER—These 2 eggs did not hatch, although development had gone far and the claw of a dead tortoise protrudes from a crack. RIGHT—On Oct. 4 the hatchlings were removed from the sandy cavity. Moisture had to be added because the air quickly hardened the shells.

FEATHERED TREASURES FROM ECUADOR

Our Greatest South American Collection

By LEE S. CRANDALL

WHEN Charles and Emy Cordier left for Ecuador on October 2, 1949, plans for their winter of collecting in the high Andes and perhaps on the lower slopes, were reasonably definite. They would pilot their gear through Customs at the port of Guayaquil, proceed to the capital city of Quito (elevation 9,200 feet) and devote the winter to a series of local expeditions. With the coming of spring or early summer, they would return to us with Umbrella Birds, possibly of both South American forms, perhaps Cocks-of-the-Rock, certainly Hummingbirds and Tanagers. A perfectly simple project — on paper. It came out like that, too. We received a marvellous collection, listed below; the press was kind, crowds are still coming to view. But there was more in the doing than plans on paper, there is more about these birds and mammals than ever will appear in words. For when you work in the Andes and in the dank lowlands that lie beyond their eastern slopes, you deal with reality, not plans and words.

After the Cordiers had arrived in Quito, they established themselves in a vacant house with a walled garden. There was a smaller building, too, into which they later moved, using the larger structure to shelter the collections as they grew. Charles equipped himself with a pick-up truck, and loading it with camping and collecting

TOP—In this cold valley of Papallacta, 11,000 fe up the eastern slope of the Andes in Ecuado the Sword-billed Hummingbird feeds on flowerin trees, just to the left of the house. CENTER—Thes are the "Angel's Trumpet" blossoms (Datura sp. yellow and brownish-red, six inches long, fro which the hummingbird feeds. BOTTOM—And th is its way of drinking artificial nectar in the Zo

THE SWORD-BILLED HUMMINGBIRD

The Green-tailed Sylph is one of the most dazzling of all the new acquisitions; its tail is a shining, iridescent green-gold.

Next to the Sword-billed, the greatest rarity is Gould's Sickle-billed Hummingbird. The curve of its beak would indicate peculiar and specialized feeding habits; it feeds on flowers whose calyxes stand upright.

equipment, he and Emy set out down the Pacific slope almost due west of Quito. Camp was established at an elevation of about 2,500 feet and it was there that Charles netted his first male Long-wattled Umbrella Bird, as related in ANIMAL KINGDOM for January-February, 1950.

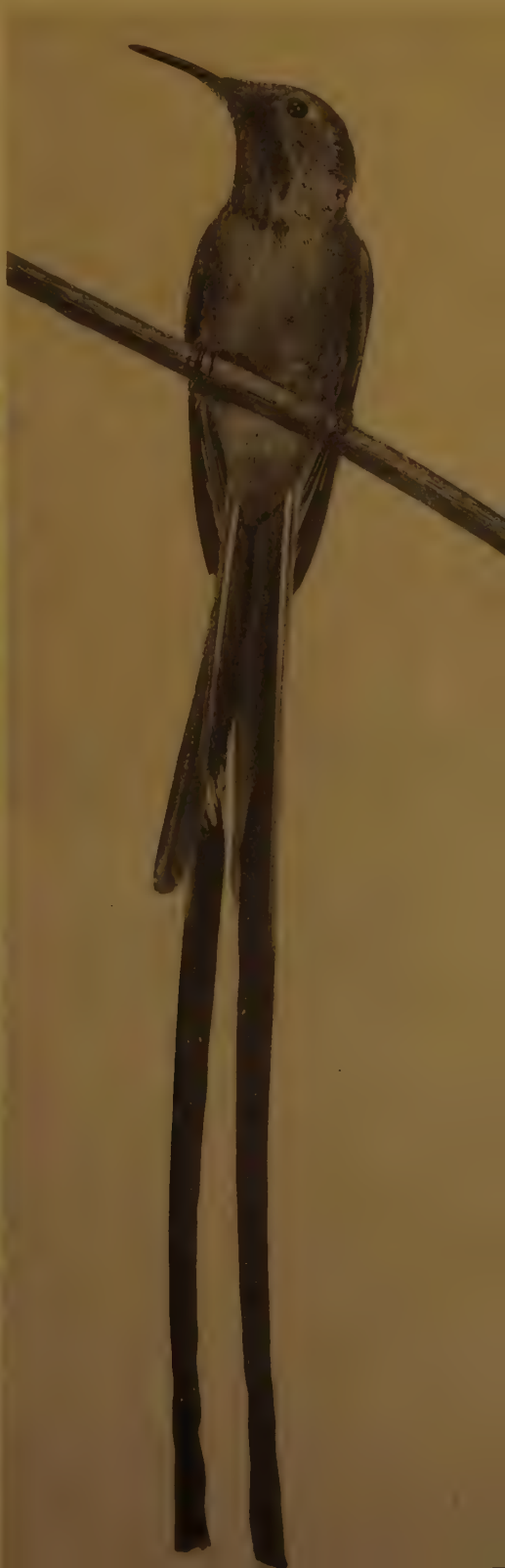
After an all-night drive, the prize was comfortably housed at the Quito headquarters. Leaving the bird in Emy's care, Charles left again for a spot still farther down the slope. Here he increased his bag of Umbrella Birds by two more males and a female. All four are now at home in the Bronx.

Having thus accomplished his Number One objective, Charles then set out to check off Number Two — the Eastern Umbrella Bird. Since this bird is known to inhabit the vast lowlands that flank the Andes at the east, this

undertaking was obviously a venture of some magnitude. Packing his gear in the pick-up and accompanied only by a native helper, Charles set forth northeastward to Shell-Mera, headquarters of the Shell Company of Ecuador, Ltd. Leaving the pick-up here in good hands, Charles proceeded by plane to the tiny airfield at Tena. Fourteen miles more by mule-train found him on the banks of the upper reaches of the Napo River, a tributary of the Amazon. From this point, in a native dugout, the explorer started down-river, in continuance of his quest. After days of hard labor and futile search for Umbrella Birds, Charles had the good fortune to be able to purchase an outboard motor from the obliging manager of an outlying Shell post. With this modern aid, movement was much facilitated and exploration of the numerous

Two immature Small-billed Thorn-bill Hummingbirds. This species is remarkable for having the shortest bill of all hummers—only four-tenths of an inch long. The bird itself is one of the smallest hummers.

The ribbony black tail and a flashing green-and-gold throat are characteristics of Boucard's Train-bearer. Its body is a metallic olive green, smooth and glistening.



LEFT—The Long-wattled Um brella Bird from the weste slope of the Andes is one of th great prizes of the Society's ex pedition. This is the first time has ever been exhibited aliv

Equally rare is the Eastern Um brella Bird, from the east slop of the Andes — another "fir timer." It has a short wattle th is generally held close again the body, and is scarcely see

forested islands continued. It was on March 2 that the first Eastern Umbrella Bird – a female – fell into the nets. In a letter from Providencia, dated March 5, Charles related his experience with this bird:

"There is quite a tale to this capture. Some days ago I received the linen thread from Augur you sent to Emy and I made up one fine large net, working like mad. The day it was ready I went over to the island to hang it up where everything had been left in readiness near the one and only fruit tree. Imagine my pleasure upon noticing that all the lines had been stolen. . . . We took the poles down, put up new lines – a matter of four men and one day– and set up the net. Then I went over to the oil camp a good mile downstream. Going and coming we had outboard motor trouble and it was 8 P.M.

before we managed to reach the nets again, thanks to bright moonlight. There was only an owl in one of the five. We were turning back when an Indian boy appeared to confide their neighbors had taken a *bogonero* (Umbrella Bird) from one of the nets. We hurried over and, sure enough, there was the female, mentioned above, in a basket. Expected to sell it to me later, no doubt."

On April 8, two males were added to the bag. The field mission completed, Charles took off down river to the military post at Tiputini, from which he expected to be flown back to Quito. Unfortunately, flooded conditions on the small airfield prohibited landing there and it was not until May 10 that, through the good offices of Mr. Werner Speck, Swiss Consul at Quito, in chartering a plane, Charles was safely returned to his base at Quito. His difficulties in keeping and feeding his precious birds and our own anxiety as to his safety during this trying period, will not soon be forgotten.

TOP — The Equatorial Cock-of-the-Rock, a form new to us, is colored tangerine, silvery and rich, velvety black.

CENTER—The Hooded Mountain Tanager is one of the largest of the Tanagers, and is a rare and colorful bird.

BOTTOM—This Turquoise Jay is probably the first one ever to be exhibited. Its plumage is in varying shades of blue.

The Comte de Paris' Star-frontlet does not belie its name, for it has a patch of iridescent, scale-like green in the center of its forehead.

The Western Buff-tailed Coronet shows the rich buff of its underwings only when it flies. It also has an iridescent area on its forehead.

Once recovered from this long and harrowing experience, Charles was quickly afield again. First, back down the eastern slope to 3,200 feet for the lovely orange-apricot Equatorial Cock-of-the-Rock. Then up to an elevation of 11,000 feet on the eastern rim above Quito for Hummingbirds and Tanagers, then again to 3,200 feet for more. Between and during each of these trips, Emy remained at her post in Quito, devotedly caring for the collection in hand and each time finding space for more. Without her, an accumulation of such magnitude would have been impossible.

As a prosaic outline of the operation of a collecting expedition, this account seems simple enough. The constant tests of skill and endurance, the days of waiting and watching, the innumerable observations of the ways and habits of little known creatures, must wait for a more detailed account by Charles Cordier himself.

When, on July 20, a special plane of the Area Company arrived at Idlewild Airport with Charles, Emy and their treasures abroad, the expectations of many months were realized. So

many rarities of the first order surely had never before come from South America.

The Long-wattled Umbrella Birds are the most spectacular with their immense breast pendants, still of unknown function. The Eastern Umbrella Bird is quite different in appearance, its white eyes and strongly depressed crest distinguishing it completely from its relative. This bird, too, has a feathered wattle, but in repose holds it so closely to its breast that it is hardly discernible. One day we may hope to know more of this.

The Equatorial Cock-of-the-Rock is a lovely creature, a strong orange-apricot in color and larger than either of the two forms already in our collection (the Eastern and the Scarlet). The crest is comparatively small, sharply cut upward from the back and strongly bushy at the front.

(*Continued on Page* 161)

The big and spectacular Chimborazo Hill-Star comes from an altitude of about 14,000 feet. Its home is among rocks and cold rain and fog.

With a bill about an inch and three-quarters long, the Lance-bill feeds from deep-belled flowers. Its beak turns very slightly upward.

All photographs by the author.

At the age of 127 days this Brush-tailed Tuan, or Phascogale, is about half-grown and it is an exceedingly alert and active little animal.

Experiences With Australia's Brush-tailed Tuan

By DAVID FLEAY

A WHOLE GENERATION is growing up in Australia without first-hand knowledge of one of our handsomest small marsupials, the Tuan, or Brush-tailed Phascogale. Once it was common enough, but a pestilence of some sort swept across the land in 1898-1900 and since then this mighty little hunter of mice, birds and insects has been absent or exceedingly rare in many localities in southern Australia.

It fascinated me and in my University days I was generally known as "Phasca" Fleay because I was always talking about the phascogale and dashing off to remote corners of Victoria in quest of a pair for breeding purposes. It took some years of searching, but I did get a breeding pair in 1932 and the main object of this article is to give an account of the first recorded breeding of the animal in captivity.

First, however, I should say that the Tuan is known scientifically as *Phascogale tapoatafa;* phascogale means, literally, "pouched weasel." It is the largest of a number of species of phascogales, about the size of the brown wharf rat, and its most prominent feature is the thickly-haired, glossy black tail—a perfect bottle brush. The pelage is silver gray, soft and smooth. Before its numbers and range were reduced, it inhabited most of Australia except the extreme north, and it particularly favored open forest country. It is an active, restless, nocturnal creature, always scurrying up and down tree trunks, cork-screwing around the trunks, signalling its annoyance when disturbed by a tap-tapping of its foot on the bark.

Success in my quest for Tuans finally came in February of 1932 because of the persistence of Gavan Crowl and Miss Zwar of Broadford, Victoria, who kept box traps set in the open forest of their home district for months until they caught two immature females for me. The bait, incidentally, was an evil-smelling mixture of Rosella parrot and honey. Two months later a male was captured in the same locality and thus I had the makings of a complete family group.

As living quarters, we built a special cage fitted with steel-lace netting—and even the wooden sides of the cage were covered with sheets of galvanized iron, for once a Tuan makes up its mind to escape it takes more than wire netting and thick wood to deter him. A leaning, stringy-

bark log and a box 12 x 6 x 4 inches with a small entrance hole were provided, but, so shy were the captives that one never saw them moving about at night unless a flashlight was switched on from some distance away. A momentary glimpse of a gray shadow with bristling black tail was usually the most one could hope for.

The diet consisted of freshly killed mice and sparrows, and bread and milk flavored with melon jam or honey. Rodents such as mice and young rats are the favorite food of these flesh and insect hunters, and no cat ever pounced on a mouse with greater keenness and swiftness than does the Brush-tailed Phascogale. When it was given a freshly killed mouse, be it day or night, it would quickly scent the victim and dispose of it, commencing at the head end with a noisy accompaniment of "scrunching." Hair, bones and even the tail disappeared, leaving no trace. Birds were occasionally left uneaten except for the brain; this was usually the case with the somewhat distasteful starlings. A phascogale once escaped at Badger Creek and on one night of freedom killed three Rosella parrots and two Bronze-winged Pigeons, eating only the brains. It is interesting to note that unlike its smaller allies, the Yellow-footed and Swainson's Phascogales, the common Dasyure (or "Native Cat") and the Tasmanian Devil — all members of the family Dasyuridae — the Brush-tailed Phascogale appears to be strongly averse to carrion. It prefers to kill its own game and feast upon it at once.

After a month in their new home the Tuans settled down sufficiently to strip shreds of bark from the log and carry them into the box to form a comfortable nest. In home trees in the bush, bark appears to be the favorite material for nest-building. Occasionally parrots were fed to the marsupials and they were dragged into the nest and their feathers added to it. Concerning the nest-building habits of this species, there is a story of two timber cutters camping out in isolated back blocks, miles from another human being. They got along amicably enough until a one pound note disappeared, and then feelings were tense until the felling of a dry tree revealed the missing money neatly incorporated in a Tuan's home!

On May 18 it was seen that the pouch area of the smaller female had developed slightly. No longer was it distinguishable from the creamy white hair of the under surface only as a yellowish patch, for the growth of dull rufous-colored hairs gave the area a distinct tinge. This development corresponded in time with that of several native cats (*Dasyurus quoll*) in a neighbouring cage. It is typical of marsupials in general, particularly members of the carnivorous Dasyuridae, to be strictly seasonal in producing their midget young. In temperate regions this invariably occurs in the depth of winter.

Typical of the Brush-tailed Tuan's habitat is this grove of Peppermint Eucalyptus. A Tuan makes its home in the hollow tree at the right.

The characteristic sweet honey-like odor, very similar to that of the pigmy glider, was noticeable when handling the Tuans.

By May 29 the larger female (with which we are concerned) also displayed a well-advanced stage in the seasonal pouch growth, and there was a distinct anterior ridge. Eight mammae were counted, and in fact, neither female possessed more than eight, although individuals

This photograph was taken the day the young Tuans were born, and soon after they had made their way into the pouch area. Their length, in curled position, was about 1/5 in.

may exhibit ten. It was considered unwise to worry the phascogales unduly at this stage, so for the greater part of June they were left strictly to themselves and were fed with studied care. Occasionally in daylight slow, prolonged hissing cries were uttered continuously for minutes at a time. Then, in the first week of July the larger female became the centre of keen interest, for attached in her now moist pouch area were three embryos no longer than a fifth of an inch (4-5 mm.) in their curled-up attitudes. The naked, flesh-colored mites showed fairly well-developed forelimbs, but otherwise were most immature, with blue pigment spots marking the position of the eyes.

The day of birth was apparently July 2. As five mammae were vacant, it is unfortunate that the mother had not been isolated previously. Evidently the other pink mites (usually there are more born than there are mammae to accommodate them) had been displaced or had fallen victims to the carnivorous tastes of the other adult animals. Bearing in mind past experience with smaller phascogales and with dasyures and their young, I removed the other inmates of the cage immediately. The smaller female may have produced embryos but none reached the pouch.

The problem of obtaining photographs was indeed a difficult one, for the Tuan was as wild and untamed as on the night when she was captured. To hold her securely for the briefest time in order to inspect the pouch was a worrying task. The muscular little animal was almost as "squirmy" as an eel, and there was danger of displacing the embryos or losing her by permitting her to jerk away suddenly. When she uttered her soft churring note of annoyance, it was advisable to see that no part of one's hand was in close proximity to the sharp teeth! However, by holding the animal myself and getting Mrs. Fleay to operate the camera, we were fortunate in securing several useful pictures. On account of the nervous temperament of the parent attempts at photography were not made until July 22 when the three infants were 20 days old and nearly three times their original size. The length of each one was now 9 mm.

On August 5, at the age of 35 days, the pink, grub-like babies were 12 mm. long, or half an inch. They now showed a good deal of movement and nearly filled the pouch area. Invariably when the mother was liberated after being handled, she made a lightning dash for the nest and we were in constant despair of the safety of the dangling babies. These fears proved to be more than mere imagination on August 16 when it was discovered that only two young phascogales remained; it was fairly certain that the mother had eaten the third.

However, on August 23, in spite of all, at 53 days, the young Tuans still existed. Dark pigment showed up the tips of the ears and the very faintest traces of fur had begun to clothe the bodies. It was seen that they were of opposite sexes. On September 1, at 62 days, there was a general thin coating of hair. They were equal in size, 60 mm. exclusive of the tail. The ears and the terminal halves of the tail were definitely

black. The eyes were still unopened on this date.

An important stage was reached on September 6 at 66 days, for now, after nine weeks of attachment to the mammae and of being dragged about and banged into obstacles, they were found for the first time lying quite free in the nest. The difficulties experienced by female phascogales in the wild (as I was able to determine later when captive animals reared full broods), carrying the normal eight young of this size and age, are a real hazard to the mother. From this time on the two young Tuans were able to fasten voluntarily to the mammae or release their hold at will. The mother generally emerged at night and left them in the nest while she sought food.

When first discovered apart from the parent, the young ones uttered faint "cha-cha!" cries. Although their eyes were still closed, their ears, eye regions and the terminal halves of the tails were conspicuously black against the faint gray tinge of the fur. On September 12, at 73 days, they were still more advanced, and the close-up photograph of the baby male (Page 156) gives a clear idea of the relatively large size of the head and the general development at this date.

When separated from the parent, the young phascogales crawled about blindly, uttering staccato "tchit-tchit!" noises, reminiscent of a small black cicada's summer song. If they were placed on the edge of the shredded bark nest, the mother immediately raked them beneath her with her forepaws, precisely as I had seen a female Dasyure do with her own young. The temperament of the female now altered considerably. The maternal instinct conquered her natural shyness to a considerable extent, causing her to respond impulsively to the babies' cries of helplessness and distress. In February 1934, even with the responsibility no longer present, the little animal was less wild than when her young were first born. She was furtive and retiring still, but quieter and more reconciled to the restricted life.

To return to September 12, it was found that when the mother raked the young ones beneath her they immediately fastened themselves to the mammae with a vise-like grip of the jaws and it was impossible to dislodge them without injury to the mammae. They would still hang there for hours at a stretch in spite of all the rough journeys on which the mother might drag them when disturbed from her nest. From the day of birth on July 2 the three mammae with young attached had gradually developed with them, but one had retrogressed with the loss of the third infant, and on September 12 the pouch consisted of two large mammary glands occupying the whole area. The remaining six, on close inspection, were only distinguishable as red pin points. In the case of a female killed by a car on the Western Highway at Gordon, Victoria, on November 27, 1933, all 8 mammae were at the stage of maximum development and the symmetrical arrangement, unlike that of many members of the American Didelphidae, showed four teats on each side of an antero-posterior median

At the end of 73 days the youngsters are showing a faint growth of fur and are no longer the grub-like mites they were at birth. Now they can free themselves from the teats.

line. They extended when pulled out to one inch and in repose were short and button like.

The two mammae in the pouch of the captive female were in a posterior position and their development had spoiled any chance of the normal regular arrangement.

On September 21, at the age of 82 days, the young animals were distinctly furred as far as the head and anterior regions of the body were concerned. However, their eyes were still closed, and although the posterior regions of the babies were still thinly haired, the tails were growing small black brushes. It was noticed that the male was a trifle smaller than the female, which corresponded to a similar stage in the development of young Dasyures.

On September 28 the young Tuans opened their eyes for the first time. They were now well clothed in short gray fur with the glossy black hairs of the terminal brush becoming most prominent. They showed instinctive alertness and fear and ran rapidly for short distances in the characteristic jerky manner of the genus. Nine days later when a hand approached them suddenly their mouths gaped open and they uttered the repeated penetrating hisses of warning used by the adults when on the defensive. Two variations of these angry notes are given by the fully grown *P. tapoatafa,* one low and deliberate; the other loud, sharp and insistent, uttered with gaping jaws and every semblance of furious resentment.

Every day saw the young Tuans make progress. They moved about actively when handled, but, strange to say, still clung at times to the mammae of the unfortunate parent. She dragged them along, much to her own discomfort and they released the grip only when they chose to do so. Usually, however, when frightened they now clung to the fur of the mother's back or sides with feet and teeth in much the same manner as young Dasyures. They were left at home in the nest while the mother sought food in the cage at night. By October 27 (at 118 days) the baby animals were seen to be a little more independent of the mother; they did not cling to her as formerly. They were brought into a lighted room at night and given their liberty, which they utilised by darting all over the place, capturing flies, and then sitting up to eat them with penetrating chewing sounds.

By November 5 (127 days) they were half-grown, with a well-clothed silky brush on the tail. They still relied very largely on the mother's mammary glands for nourishment, but an appetite for insects and adult food was fast developing. Their increasing venturesomeness while at liberty in the living room at night was made noticeable by sudden appearances on table tops. Then followed rapid scampering up my trouser-legs to my shoulders, and meteor-like leaps into space with tails fully bristled. Nevertheless they were still very dependent on their mother, for if they were kept from her overnight in a separate cage, morning would find them cold, dormant and able to move only with difficulty. It was at this time (November 27), when driving along the Western Highway at night near Gordon, that I picked up the dead female of the species with a pouch at a stage similar to that of my captive female, showing the complete eight mammae equally developed. The dead female had evidently reared the full number of young. Fortunately the orphans thrown so suddenly on their own resources would be able to make an effort to fend

At 73 days the baby has a strong head development and shows pigmentation in the ear and eye region, and on tail.

At 98 days the young Brush-tailed Tuans are in a fairly advanced stage of development—short-furred still, but the tails are well-haired.

for themselves. It seems that in the case of Dasyures and phascogales, when the young are no longer suckled they must perforce hunt on their own initiative, for, seemingly, the female parent has little idea of taking any of her kills to the nursery.

From the half-grown stage of November 5, the two young Tuans now grew rapidly, and towards the close of November, at the age of four months, they were capable of a completely independent existence. Dashing about on chair tops and sofa backs at night, and lacking the furtive ways of their kind in the presence of man, they showed some of the more intimate and interesting habits of the species at close quarters. When excited or agitated (notably when the time of recapture arrived), they perched momentarily on a vantage point, with naked leaf-like ears upstanding, and vibrated the tail base, imparting a rapid wriggling motion to the whole black-plumed tail. This, of course, is not an exclusive habit of any one marsupial and is seen even in wallabies. At other times, when startled and puzzled, they would progress slowly in short deliberate jumps, rapping first both forefeet smartly on the woodwork or chair back, repeating the action in the same fashion with both hind feet. This staccato tap-tapping sound may also be made with all four feet at once, or with a single forefoot or hind foot. It is at once a very distinctive and interesting feature of the Brush-tailed Tuan. Another phascogale near at hand, hearing the sound, is liable to become infected with the same emotion, and it then repeats the tap-tapping action.

Early in February, 1934, seven months from the time of birth, the young animals were fully grown and mature. The male, as usual, was bigger, stouter and stronger than the female. Like young Dasyures, their high spirits and playful nocturnal antics knew no bounds. Leaping from end to end of the cage, with black tails fully bristled, and careening just as easily upside down across the wooden roof, to turn about in a flash, they passed the hours playing hide and seek with graceful effortless movements while the bright black eyes gleamed in the sharp, prick-eared faces.

In small crevices to which the sharp muzzles could not penetrate, they made an intelligent use of the long and slender manus, and I have watched the young animals inserting the two longer-clawed digits (3 and 2) into such cracks in quest of insect game. The value of such a method in pulling beetles from under the bark is obvious. On rare occasions, in daylight, the animals emerged for a brief period to bask in the rays of the sun. The number of intimate customs revealed in the young lives of these phascogales was in strong contrast to the secretive, furtive habits of the adults; when caught fully grown they rarely, and sometimes never, drop their shy, retiring ways.

BRAYTON EDDY

In Memoriam

Brayton Eddy was one of that fortunate company of people, so limited in numbers, whose lives are made rich by a consuming interest. He seemed to be guided by a testament that knowledge of the lesser forms of life would lead him to a clearer understanding of life itself. His devotion to the study of insect life was contagious. Few contemporary American naturalists have done as much in interpreting to the public both the value and the fascination of insects. After joining the staff of the Society he extended his attention to reptiles and became ever more enthusiastic about this new field of work which offered so many opportunities for education.

His early interest in philosophy, in which he took his Bachelor's degree at Brown University in 1921, soon crystalized and gave direction to his subsequent activities. In order to equip himself he worked as a graduate student at the Biological Laboratory at Cold Spring Harbor in 1931 and at Cornell University during three successive years. In 1935 he did a most original thing in establishing an Insect Zoo, located near Providence, R. I. Several years later he became administrator of the Office of Entomology and Plant Industry for the State of Rhode Island, and then came to the New York Zoological Park in January, 1945, under the appointment of Curator of Insects and Acting Curator of Reptiles, later becoming Curator of Reptiles. He was a member of the American Association of Economic Entomology, the Entomological Society of America, the American Society of Ichthyologists and Herpetologists and other scientific and technical associations.

Those of us who were fortunate enough to know him intimately and to work with him were made happy by his amiability and the natural expansiveness of his personality. It was a delight to observe his deep interest in young people and their entomological or herpetological aspirations. He always had time to see a youngster with a

praying mantis, or some other to-the-youngster-mysterious insect or reptile (in a cardboard box or a milk bottle), whom he invariably welcomed to his office while he explained the creature's life history and habits. Very few people have the time or patience for that sort of thing. Many a boy and girl will remember Brayton Eddy as the first naturalist who took an interest in them.

His death was untimely, although long before it occurred he himself, aware of a serious heart ailment, realized that he was living on "borrowed time." His courage in this situation was extraordinary. He refused to allow it to make any difference in his life's work. One of the last activities he engaged in was a collecting expedition late this Spring in the blistering heat in the Salt Lake plains in Utah. He collapsed on the evening of that day, though after hospitalization he was able to return to his home in New York and his activities at the Zoological Park, where he died some two months later on July 17, 1950. Brayton Eddy made invaluable contributions to the work and growth of our institution. He will be greatly missed. — FAIRFIELD OSBORN.

News from the Conservation Foundation

The Staff Reports on Summer Activities

DURING THE SUMMER the staff of the Foundation wound up several major activities initiated last year and began preparations for new undertakings.

A survey of industrial water use and industrial pollution, conducted jointly by the National Association of Manufacturers and the Foundation, has brought an overwhelming return of questionnaires from some 5,000 manufacturers, which will provide a picture of industrial water use that, heretofore, was completely unavailable. The data are currently being analyzed and will be published in the late fall. This study is an outgrowth of the ground water survey completed early this summer, which McGraw-Hill will publish in late winter.

A contract has been negotiated with the University of Pittsburgh School of Law whereby the Foundation provided funds for a survey of Pennsylvania's conservation laws and administrative organization practices. This is part of a long-range program of special studies and undertakings in several large universities. Others already negotiated are the Chair of Conservation at Yale University and the study being made at the Littauer School at Harvard of economic factors affecting the adoption of conservation practices. For this latter work the Foundation has provided fellowships for about six government experts in various fields.

Arrangements have been made for the first conservation workshop for New York City school teachers. Lectures and field trips will "teach the teachers" how to interpret conservation problems to city children, and the program can serve as a pattern for other urban centers.

Our third series of films, "The Web of Life" — two multiple reels in color and sound — has been accepted by the Encyclopaedia Brittanica Films with considerable enthusiasm and will be distributed this fall. John Storer, our photographer, and his assistant have covered the entire country and have brought back more than 10,000 feet of film for our forthcoming "Living Water" series. This material will be edited during the fall. The scrips of eight filmstrips on soil have been completed and Encyclopaedia Brittanica Films will produce them in the course of the next several months.

During the summer President Osborn made a lengthy trip through the far west, including a survey of timber operations in the northwest.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Three Gibbons in Three Days — and a Raccoon to Boot!

One of the troublesome end-of-summer chores around the Zoological Park is the recapture of our White-handed Gibbon family on Gibbon Island, for cold-weather exhibition indoors. After a summer's liberty in the treetops, these long-armed acrobats are apt to be suspicious of box traps and it sometimes takes several weeks of patient waiting and daily baiting of the trap with fruits before they allow themselves to be caught. Last year it was dangerously far into October before the Gibbon trio was secured.

Expecting the same difficulty this year, and planning ahead for the exhibition of the animals in our new Great Apes House in early October, keepers set out their box traps on September 12. Three days later all three Gibbons had allowed themselves to be caught – certainly a record.

And not only the Gibbons – on the second night the traps were in place, a young Raccoon

***NOTE FOR FIFTY YEARS HENCE:** On November 8, 1949, the fiftieth anniversary of the Zoological Park, several staff officers of the Park made recordings of extemporaneous talks which they hoped would survive and be in playable condition on the Park's hundredth birthday on November 8, 1999. The recordings—on a disc and on magnetic tape—were sealed in a stainless steel box and on July 28, 1950, it was deposited under a slab at the east side of the main steps of the new Great Apes House. Assisting are (left to right): D. Fortunato, the general contractor of the building; Executive Secretary John Tee-Van, and Quentin Schubert, Superintendent of Construction and Maintenance. The position will be marked on top of the slab.*

attempted to steal food out of one of them. It is a wild wanderer, and is now in quarantine in the Animal Hospital.

We Have "Upside Down" Catfish

Specimens of the Upside Down Catfish have recently been received by the Aquarium. These are remarkable for their faculty of swimming either belly upward or right side up with equal ease. In fact, they seem to prefer the reversed position, spending most of their time resting or swimming upside down.

They belong to the group of African freshwater catfishes of the genus *Synodontis,* but exactly what species we have is not known, principally because our specimens are still quite small – less than two inches long. Although these strange fishes and their strange locomotor habits have been recognized for many years, they apparently have never before been imported alive into America – J. W. A.

Feathered Treasures from Ecuador

(*Continued from Page* 151)

There are so many beautiful Tanagers that there is not space for an appreciation of them all. The Red-eared Tanager is lovely, in velvet black, with abdomen and cheek crescent scarlet and the back and shoulders of sky blue enamel. The Red-backed Paradise Calliste must be the most dazzling of this brilliant group. Its pale-green head, deep black wings, turquoise breast and crimson back are gay enough in themselves but when they appear on feathers held as tight as wax, they take on a luminescent quality seen in few birds.

It is among the Hummingbirds that the greatest wonders are found. Best of all is the Sword-bill, a creature with a beak nearly five inches in length, considerably in excess of that of the body. "Incredible" is the descriptive word that comes to mind. For at first glance, bird and beak appear to be separate entities and it is only on second look that they are seen to be one. To keep and maintain this bird for the first time in history is a real triumph for the skill of Charles Cordier, for in doing so he has accomplished a feat long considered to be impossible.

Then there is the little Thorn-bill, with a tiny beak which, Charles reports, is useful for feeding from the flat blooms of the Compositae. The Sickle-bill, with its beak so sharply de-curved as to suggest a scimitar, is one of the most difficult to induce to take liquid from a glass feeding tube. Yet once it has learned, it performs this feat with great facility. Racket-tails, Puff-legs, Train-bearers, Heavenly Sylphs, Hill Stars – all are so lovely in brilliant plumage and graceful flight that they are enthralling in their varied beauty.

Charles and Emy Cordier have again registered a great success, an accomplishment which, through recent years, we have come to expect of them.

* * *

In all, the collection includes 211 specimens of 88 forms, 64 of them new to us. The list follows:

NEW YORK ZOOLOGICAL SOCIETY'S
ECUADORIAN EXPEDITION
Received July 20, 1950

(*Denotes species new to our collection.)

MAMMALS:

- *3 Rio Napo Marmosets – *Mystax graellsi* (Espada)
- *1 Golden-mantled Marmoset – *Leontocebus tripartitus* (Milne-Edwards)
- *1 Ecuadorian Night Monkey – *Aotus gularis* (Dollman)
- *1 Mantled Howling Monkey – *Alouatta palliata aequatorialis* (Festa)
- 3 Azara's Opossums – *Didelphis paraguayensis* (Oken)
- *1 South American Woolly Opossum – *Philander laniger laniger* (Desmarest)
- 1 Ecuadorian Wild Dog – *Pseudalopex culpaeus reisii* (Helzheimer)
- 1 Kinkajou – *Potos flavus* (Schreber)

BIRDS:

- 1 Jardine's Pigmy Owl – *Glaucidium jardinii jardinii* (Bonaparte)
- *1 Ecuadorian Sword-billed Hummingbird – *Ensifera ensifera ensifera* (Boissonneau)

*2 White-tailed Hill Stars – *Urochroa bougueri leucura* Lawrence
*4 Boucard's Train Bearers – *Lesbia victoriae aequatorialis* Boucard
*3 Salvin's Sun Angels – *Heliangelus amethysticollis laticlavius* Salvin
*1 Brown Violet-eared Hummingbird – *Colibri delphinae* (Lesson)
6 Gould's Violet-eared Hummingbirds – *Colibri coruscans coruscans* (Gould)
*3 Western Buff-tailed Coronets – *Boissonneaua flavescens tinochlora* Oberholser
*1 Rosy-throat – *Heliodoxa rubinoides cervinigularis* (Salvin)
*1 Amethyst Hummingbird – *Calliphlox amethystina* (Boddaert)
7 Black-billed Emeralds – *Chlorostilbon gibsoni melanorhynchus* Gould
2 Green-headed Emeralds – *Amazilia franciae viridiceps* (Gould)
*3 Heine's Hummingbirds – *Amazilia tzacatl jucunda* (Heine)
*5 Green-tailed Sylphs – *Aglaiocercus kingi mocoa* (DeLattre & Bourcier)
1 Heavenly Sylph – *Aglaiocercus coelestis coelestis* (Gould)
*4 Ecuadorian Copper-tails – *Metallura williami primolina* Bourcier
*2 Quito Tyrian-tails – *Metallura tyrianthina tyrianthina* (Loddiges)
*5 Small-billed Thorn-bills – *Ramphomicron microrhynchum microrhynchum* (Boissonneau)
*7 Comte de Paris' Star-frontlets – *Coeligena lutetiae* (DeLattre & Bourcier)
*4 Collared Incas – *Coeligena torquata torquata* (Boissonneau)
*1 Scissor-tailed Racket-tail – *Ocreatus underwoodii peruanus* (Gould)
*1 Emily's Hermit – *Phaethornis guy apicalis* (Tschudi)
*3 Chimborazo Hill Stars – *Oreotrochilus chimborazo chimborazo* (DeLattre & Bourcier)
*1 Pichincha Hill Star – *Oreotrochilus chimborazo jamesonii* Jardine
*2 Gould's Sickle-bills – *Eutoxeres aquila heterura* Gould
*1 Green-breasted Puff-leg – *Eriocnemis vestitus smaragdinipectus* Gould
*1 Black-breasted Puff-leg – *Eriocnemis nigrivestis* (Bourcier & Mulsant)
*1 Bouquet's Puff-leg – *Eriocnemis luciani luciani* (Bourcier)
*1 Long-billed Lance-bill – *Doryfera ludovicae rectirostris* Gould
6 Orange-breasted Barbets – *Capito aurovirens* (Cuvier)
1 Rufous-fronted Barbet – *Capito squamatus* Salvin
*2 Sclater's Motmots – *Momotus momota microstephanus* Sclater
*1 Many-banded Aracari – *Pteroglossus pluricinctus* Gould
*3 Chestnut-eared Aracaris – *Pteroglossus castanotis castanotis* Gould
*5 Yellow-billed Aracaris – *Pteroglossus flavirostris flavirostris* Fraser
*1 Red-backed Aracari – *Pteroglossus erythropygius* Gould
1 Cuvier's Toucan – *Ramphastos cuvieri cuvieri* Wagler
*3 Western Black Woodpeckers – *Melanerpes cruentatus extensus* (Todd)
*1 Chestnut-crowned Ant-pitta – *Grallaria ruficapilla ruficapilla* Lafresnaye
*1 Mountain Ant-pitta – *Grallaria quitensis quitensis* Lesson
*1 Black-faced Tityra – *Tityra semifasciata nigriceps* Allen
*1 Banded Cotinga – *Pipreola arcuata* (Lafresnaye)
*3 Red-crested Cotingas – *Heliochera rubrocristata* (Lafresnaye & d'Orbigny)
*3 Purple-throated Fruit Crows – *Querula purpurata* (Müller)
*11 Equatorial Cocks-of-the-Rock – *Rupicola peruviana aequatorialis* Taczanowski
*2 Eastern Umbrella Birds – *Cephalopterus ornatus ornatus* St. Hilaire
*4 Long-wattled Umbrella Birds – *Cephalopterus ornatus penduliger* Sclater
*1 Berlepsch's Golden-headed Manakin – *Pipra erythrocephala berlepschi* Ridgway
*3 Ecuadorian Manakins – *Manacus manacus leucochlamys* Chapman
1 Violaceus Jay – *Cyanocorax violaceus* Du Bus
*1 Turquoise Jay – *Cyanolyca turcosa* (Bonaparte)
5 Peruvian Green Jays – *Cyanocorax yncas yncas* (Boddaert)
*1 White-eyed Black Robin – *Platycichla flavipes leucops* (Taczanowski)
*1 Masked Sugar-bird – *Diglossa cyanea cyanea* (Lafresnaye)
*1 Indigo Sugar-bird – *Diglossa indigotica* Sclater
1 Yellow-backed Cacique – *Cacicus cela cela* (Linnaeus)
1 Giant Oriole – *Gymnomystax mexicanus* (Linnaeus)
2 Western Swallow-tanagers – *Tersina viridis occidentalis* (Sclater)
4 Tawny-crowned Tanagers – *Tachyphonus delatrii delatrii* Lafresnaye
*13 Red-eared Tanagers – *Poecilothraupis igniventris erythrotus* (Jardine & Selby)
*1 Orange-breasted Tanager – *Poecilothraupis lacrymosa palpebrosa* (Lafresnaye)
*2 Blue-capped Tanagers – *Thraupis cyanocephala cyanocephala* (Lafresnaye & d'Orbigny)
2 Darwin's Tanagers – *Thraupis bonariensis darwinii* (Bonaparte)
*2 Orange-crested Tanagers – *Iridosornis rufivertex rufivertex* (Lafresnaye)
2 Hooded Mountain Tanagers – *Buthraupis montana cucullata* (Jardine & Selby)
3 Rieffer's Grass-green Tanagers – *Chlorornis riefferii riefferii* (Boissonneau)
3 Lesser Magpie Tanagers – *Cissopis leveriana leveriana* (Gmelin)
*2 Blue-shouldered Mountain Tanagers – *Compsocoma flavinucha somptuosa* (Lesson)

*2 Buff-breasted Mountain Tanagers – *Dubusia taeniata taeniata* (Boissonneau)
*1 Finch-like Tanager – *Oreothraupis arremonops* (Sclater)
*1 Yellow-throated Olive Tanager – *Chlorospingus flavigularis flavigularis* (Sclater)
*3 Yellow-breasted Spotted Callistes – *Tangara xanthogastra* (Sclater)
*3 Northern Blue-necked Callistes – *Tangara cyanicollis caeruleocephala* (Swainson)
*1 Red-backed Paradise Calliste – *Tangara chilensis chilensis* (Vigors)
*4 Short-billed Euphonias – *Tanagra xanthogaster brevirostris* (Bonaparte)
1 Yellow-breasted Grosbeak – *Pheucticus chrysopeplus chrysogaster* (Lesson)
*2 Boissonneau's Sparrows – *Atlapetes torquatus assimilis* (Boissonneau)
1 Chestnut-capped Buarremon Sparrow – *Atlapetes brunnei-nucha brunnei-nucha* (Lafresnaye)
*2 Slaty-backed Sparrows – *Atlapetes rufinucha spodionotus* (Sclater & Salvadori)

REPTILE:

1 South American Boa – *Constrictor constrictor constrictor* (Linnaeus)

THEY WERE BORN ALIVE

Baby Lizards and Their Mother

Most lizards produce eggs from which their young are hatched, but the Common Lizard of Europe (*Lacerta vivipara*) bears living young, producing up to a dozen miniature lizards at a birth. While we have often exhibited the Common Lizard, the birth of young to specimens in the Zoological Park is rare. The six inch-long babies shown above, with the female, were born in July.

This particular lizard has the further distinction of being the only reptile found in Ireland.

ADULTS' DAY AT THE ZOO

. . . but darling, grown-ups like to see these things, too!

There is a point of view, widely held by the young, that a zoological park is maintained primarily for children. Over the years the New York Zoological Society has developed a contrasting philosophy – that while it is necessary to balance instruction with entertainment, presentation of the animal life of the world on an adult level gives children something to grow up to.

Some of our members apparently feel about the same way – and insist on their rights. Mrs. Ben Jorj Harris, one of our members, overheard a bit of conversation in the Gorilla House on Members' Day last June, and illustrated it in the cartoon above.

Venezuelans Learn About Jungle From Beebe-Crane Film

Since our Department of Tropical Research began studies in Venezuela in 1942, Dr. Beebe and Miss Crane have taken thousands of feet of motion picture film in color and selections from it have usually been shown at the January Members' Meeting of the Society. Film taken in 1942, 1945 and 1946 was combined and scored in Span-

ish, and has been distributed by the Creole Petroleum Corporation. Just before his return from his recent expedition to Trinidad, Dr. Beebe received the following note from Arthur T. Proudfit, president of Creole:

"Our public relations people have just shown me a compilation of the audiences to which have been shown your and Jocelyn Crane's color motion picture, *Curioseando en la Selva*. I thought you would be interested to know that through March of this year the picture has been seen by 154,000 persons. It is still going strong, there having been 84 showings in March to 9,995 persons. The list of showings indicates that the picture has been seen all over the country, in the *pueblecitos* as well as in the larger towns and cities.

"We continue to be extremely pleased with the response we are receiving from the picture."

From comments the Department of Tropical Research has heard, Venezuelans are as fascinated by the film's revelations of the natural history of their own jungles as Members of the Zoological Society have been.

PUBLICATIONS OF INTEREST

KEEP THEM ALIVE. How to Keep Snakes, Lizards, Turtles, Alligators, and Crocodiles in Captivity. By E. Ross Allen & Wilfred T. Neill. 24 pp., 3 figs. Special Publication No. 1, The Reptile Institute, Silver Springs, Fla., 1950. 75 cents.

FIELD GUIDE TO THE LIZARDS AND SNAKES OF WISCONSIN. By W. E. Dickinson. 70 pp., 6 figs., 11 distribution charts, 11 colored plates. Popular Science Handbook Series, No. 2, Milwaukee Public Museum, Milwaukee, Wis., 1949. 75 cents.

REPTILES OF AUSTRALIA: Crocodiles, Snakes and Lizards. By Charles Barrett. 168 pp., 56 illus. Cassell & Co., Melbourne, 1950. 27/6.

Here are three publications that should be welcomed by students of reptile life.

"Keep Them Alive," by the director of the Reptile Institute at Silver Springs, Fla., and an associate who has maintained a private collection of reptiles, is for the beginner. It collects in one small pamphlet a surprising amount of practical information about the care, feeding and habits in captivity of reptiles, gives a chart of food preferences for forty snakes, and closes with a bibliography of similar reference works on the care of reptiles. The snake section is particularly full, and snakes in the collections of amateur herpetologists will bless the authors for their insistence on proper cages, minimum handling, etc.

There are a number of handbooks of the reptiles of particular states but few as well designed as Dickinson's "Lizards and Snakes of Wisconsin." The author, curator of invertebrate zoology at the Milwaukee Public Museum, has illustrated in colored drawings the head in two aspects and a section of the body of each of the five lizards and 29 snakes recorded in Wisconsin, with the exception of one snake (the Brown Snake, *Haldea valeriae valeriae*) which has been reported only once. Distributional maps show where each of the 34 lizards and snakes has been found. There is a key for determination of all the forms, brief summaries of habits and descriptions of each. The colored plates, while lacking something in faithfulness of color in a good many instances, are certainly an advance on the more usual black-and-white photographs.

Charles Barrett ("Reptiles of Australia") offers a popular account of Australian crocodiles, snakes and lizards, plentifully illustrated. He quotes from many writers on Australian reptile life, which necessarily produces a somewhat jumpy style, but the material is lively and anecdotal and should be quite useful, at least to the non-professional student. — W.B.

SELECTED INVERTEBRATE TYPES. Edited by Frank A. Brown, Jr. xx+597 pp., 235 figures. John Wiley & Sons, Inc., New York, 1950. $6.00.

The avowed principal purpose of this book is to provide an adequate laboratory manual for students of invertebrate zoology — a purpose that it no doubt more than satisfactorily fulfills. We should like to praise it from another angle, however: that of a general, handy reference volume to help the zoologist (be he student, teacher or curator) to answer questions, innocently put but involving depths and latitudes of learning beyond those of ordinary non-specialists.

Here in one reasonably-sized book are outlines on the anatomy of 128 of our common animals without backbones, together with clear, well labeled illustrations and illuminating side lights on their modes of life and the functions of the various structures described. As aquarists we have noted accounts of a number of aquatic animals, including squid, hard-shelled clams, waterfleas, horseshoe crabs and starfish, that are important to us, and even casual study of what the book has to say about them revealed to us important facts. The 13 experts who collaborated in writing this book well deserve both commendation and thanks. — J. W. A.

New Members of the New York Zoological Society

(Between July 1 and August 31)

Contributing

Roger H. Bacon
Robert Browne
Donald T. Carlisle
Mrs. Morton Fearey
Thomas E. Hardenbergh
Oliver B. Merrill
Mrs. Francis Rogers
Ira A. Schur
Henry C. Scott
Mrs. Charles Slaughter
Dr. Kenneth E. Stein
Norman I. Stotz

Annual

H. A. Bautzmann
Harold Bruce
Mrs. Alice Collins
John E. Ellsworth
Miss Emma A. Hutchings
Miss Patricia Kenney
Mrs. Wm. S. Ladd, Jr.
Karl Larsen
Robert J. Leykum
Charles B. Nisselbaum
Peter R. Ryhiner
Nathan Sloan
B. C. Tousey
Samuel Wolf

Want to be a

COLLECTOR?

There is only one Charles Cordier — bringing back to us the rarest animals from all over the world. But you, too, can be a collector for our Society, right here at home!

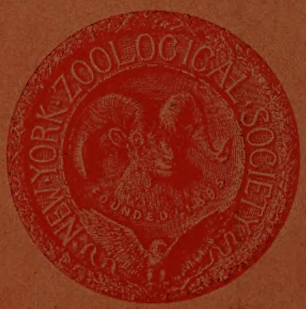
We need new Members — lots of them. Five years ago our Members loyally fell to and helped us mightily in bringing in enough new Members to carry our Membership to an all-time high.

Now we urge this help again.

Please send us the names and addresses of people who should be associated with the Society's work.

We will send them invitations to join, mentioning your name or not mentioning it, just as you prefer. A postal card is enclosed with this issue of ANIMAL KINGDOM for your convenience.

MEMBERSHIP DEPARTMENT,
New York Zoological Society,
The Zoological Park,
New York 60, N. Y.


NEW YORK ZOOLOGICAL SOCIETY
FOUNDED 1895